Patent Claims

1. Data registration device for data processing systems, particularly for the determination of multi-dimensional coordinates created by means of exertion of displacement and/or rotational forces, with

   - a stand (1);
   - a retainer element (4) mounted in the stand (1) so that it may be displaced in two or three mutually perpendicular directions;
   - an operating ball (7) that may be rotated through three axes but not displaced within the retainer element (4);
   - sensors (8, 10, 16, 12) to determine the displacement of the retainer element (4) and the rotation of the operating ball (7);
   - an interface unit that transmits the data delivered from the sensors (8, 10, 16, 12) to the connected data processing system;

   characterized in that the operating ball (7) is mounted within the retaining element (4) such that it may be grasped on two at least partially diametrically opposed sphere segment sections with the thumb and forefinger of one hand, and that both the displacement forces and the rotation forces with respect to all axes may be exerted by means of the operating ball (7).

2. Data registration device per Claim 1, characterized in that the retainer element (4) may be simultaneously displaced in the direction of several displacement axes, and that the operating ball (7) may be rotated simultaneously about several axes.

3. Data registration device per Claim 1 or 2, characterized in that the retainer element (4) possesses a frame-shaped ball mount (15) that surrounds the operating ball (7) along a great circle in a surrounded section greater than π.

4. Data registration device per Claim 1 or 2, characterized in that the retainer element (4) includes a key-shaped ball mount (22).

5. Data registration device per Claim 4, characterized in that the operating ball (7) is mounted magnetically within the key-shaped ball mount (22), whereby the operating ball (7) is hollow and is made of a non-magnetic material, whereby a magnetizable retaining ball is mounted within the operating ball (7) so that it may move freely, and whereby a magnetic field source positioned outside the operating ball attracts the retaining ball into the key-shaped ball mount (22), and whereby the operating ball (7) is mounted in the ball mount so that it may rotate.

6. Data registration device per one of Claims 3 through 5, characterized in that the retainer element (4) includes the ball mount (15, 22), an inner frame (5), and an outer frame (6), whereby the ball mount (15, 22) is mounted within the inner frame (5) which itself is mounted in the outer frame such as to be displaceable along a first direction, which in turn is mounted in the stand (1) such as to be displaceable along a second direction perpendicular the first direction, and whereby at least one of these

components (15, 22; 5; 6) of the retainer element (4) is displaceable along a third direction that is perpendicular to the first and the second direction.

7. Data registration device per one of Claims 1 through 6, characterized in that return elements (9, 11) are included that return the retainer element (4) or its components to a rest position when no displacement force is being exerted.

8. Data registration device per one of Claims 1 through 7, characterized in that displacement of the retainer element (4) is registered by path, force, and/or acceleration sensors.

9. Data registration device per one of Claims 1 through 8, characterized in that at least two motion sensors (12) are positioned within the retainer element (4) that register the rotation of the operating ball (7) about three mutually-perpendicular axes.

10. Data registration device per Claim 9, characterized in that the motion sensors (12) are optical sensors that sample the surface of the operating ball (7) and its rotation.

11. Data registration device per one of Claims 1 through 10, characterized in that additional actuators (26) are included that oppose or reinforce a varying force in reaction to control signals from the user resulting from displacement of the retainer element (4) and/or rotation of the operating ball (7).

12. Data registration device per one of Claims 1 through 11, characterized in that additional switches are included that transmit additional control signals to the data processing system upon actuation.